

VIA Discussions at XIV Bled Workshop

Maxim Yu. Khlopov^{1,2,3}

¹ *Moscow Engineering Physics Institute (National Nuclear Research University), 115409 Moscow, Russia*

² *Centre for Cosmoparticle Physics "Cosmion" 125047 Moscow, Russia*

³ *APC laboratory 10, rue Alice Domon et Léonie Duquet
75205 Paris Cedex 13, France*

Abstract

Virtual Institute of Astroparticle Physics (VIA), integrated in the structure of Laboratory of AstroParticle physics and Cosmology (APC) is evolved in a unique multi-functional complex of *e – science* and *e – learning*, supporting various forms of collaborative scientific work as well as programs of education at distance. The activity of VIA takes place on its website and includes regular videoconferences with systematic basic courses and lectures on various issues of astroparticle physics, regular online transmission of APC Colloquiums, participation at distance in various scientific meetings and conferences, library of their records and presentations, a multilingual Forum. VIA virtual rooms are open for meetings of scientific groups and for individual work of supervisors with their students. The format of a VIA videoconferences was effectively used in the program of XIV Bled Workshop to provide a world-wide participation at distance in discussion of the open questions of physics beyond the standard model. The VIA system has demonstrated its high quality and stability even for minimal equipment (laptop with microphone and webcam and WiFi Internet connection).

1 Introduction

Studies in astroparticle physics link astrophysics, cosmology, particle and nuclear physics and involve hundreds of scientific groups linked by regional networks (like ASPERA/ApPEC [1]) and national centers. The exciting progress in these studies will have impact on the fundamental knowledge on the structure of microworld and Universe and on the basic, still unknown, physical laws of Nature (see e.g. [2, 3] for review).

In the proposal [4] it was suggested to organize a Virtual Institute of Astroparticle Physics (VIA), which can play the role of an unifying and coordinating structure for astroparticle physics. Starting from the January of 2008 the activity of the Institute takes place on its website [5] in a form of regular weekly videoconferences with VIA lectures, covering all the

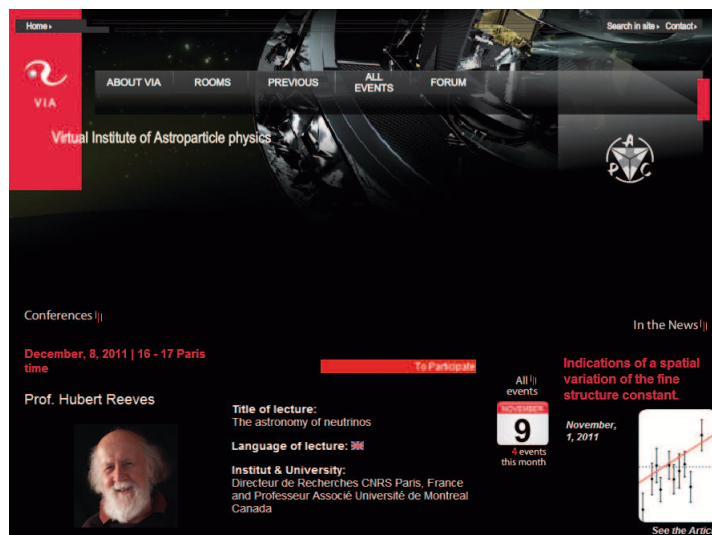


Figure 1: The home page of VIA site

theoretical and experimental activities in astroparticle physics and related topics. The library of records of these lectures, talks and their presentations is now accomplished by multi-lingual Forum. In 2008 VIA complex was effectively used for the first time for participation at distance in XI Bled Workshop [6]. Since then VIA videoconferences became a natural part of Bled Workshops' programs, opening the virtual room of discussions to the world-wide audience. Its progress was presented in [7, 8]. Here the current state-of-art of VIA complex, integrated since the end of 2009 in the structure of APC Laboratory, is presented in order to clarify the way in which VIA discussion of open questions beyond the standard model took place in the framework of XIV Bled Workshop.

2 The current structure of VIA complex

2.1 The forms of VIA activity

The structure of VIA complex is illustrated on Fig. 1. The home page, presented on this figure, contains the information on VIA activity and menu, linking to directories (along the upper line from left to right): with general information on VIA (About VIA), entrance to VIA virtual lecture hall and meeting rooms (Rooms), the library of records and presentations (Previous) of VIA Lectures (Previous \rightarrow Lectures), records of online transmissions of Conferences (Previous \rightarrow Conferences), APC Seminars (Previous

→ APC Seminars) and APC Colloquiums (Previous → APC Colloquiums) and courses, Calender of the past and future VIA events (All events) and VIA Forum (Forum). In the upper right angle there are links to Google search engine (Search in site) and to contact information (Contacts). The announcement of the next VIA lecture and VIA online transmission of APC Colloquium occupy the main part of the homepage with the record of the most recent VIA events below. In the announced time of the event (VIA lecture or transmitted APC Colloquium) it is sufficient to click on "to participate" on the announcement and to Enter as Guest in the corresponding Virtual room. The Calender links to the program of future VIA lectures and events. The right column on the VIA homepage lists the announcements of the regularly up-dated hot news of Astroparticle physics.

In 2010 special COSMOVIA tours were undertaken in Switzerland (Geneva), Belgium (Brussels, Liege) and Italy (Turin, Pisa, Bari, Lecce) in order to test stability of VIA online transmissions from different parts of Europe. Positive results of these tests have proved the stability of VIA system and stimulated this practice at XIII Bled Workshop. These tours assumed special equipment, including, in particular, the use of the sensitive audio system KONFTEL 300W [9]. The records of the videoconferences at the previous XIII Bled Workshop are available on VIA site [10].

In 2011 VIA facility was effectively used for the tasks of the Paris Center of Cosmological Physics (chaired by G. Smoot), for the public programme "The two infinities" (conveyed by J.L.Robert) for Post-graduate programme assumed by the agreement between the University Paris Diderot and the University of Geneva. It has effectively supported participation at distance at meetings of the Double Chooz collaboration: the experimentalists, being at shift, took part in the collaboration meeting in such a virtual way.

It is assumed that the VIA Forum can continue and extend the discussion of questions that were put in the interactive VIA events. The Forum is intended to cover the topics: beyond the standard model, astroparticle physics, cosmology, gravitational wave experiments, astrophysics, neutrinos. Presently activated in English, French and Russian with trivial extension to other languages, the Forum represents a first step on the way to multi-lingual character of VIA complex and its activity.

One of the interesting forms of Forum activity is the educational work. For the last four years M.Khlopov's course "Introduction to cosmoparticle physics" is given in the form of VIA videoconferences and the records of these lectures and their ppt presentations are put in the corresponding directory of the Forum [11]. Having attended the VIA course of lectures in order to be admitted to exam students should put on Forum a post with their small thesis. Professor's comments and proposed corrections are

put in a Post reply so that students should continuously present on Forum improved versions of work until it is accepted as satisfactory. Then they are admitted to pass their exam. The record of videoconference with their oral exam is also put in the corresponding directory of Forum. Such procedure provides completely transparent way of estimation of students' knowledge.

2.2 VIA lectures, online transmissions and virtual meetings

First tests of VIA system, described in [4, 6, 7, 8], involved various systems of videoconferencing. They included skype, VRVS, EVO, WEBEX, mar-ratech and adobe Connect. In the result of these tests the adobe Connect system was chosen and properly acquired. Its advantages are: relatively easy use for participants, a possibility to make presentation in a video contact between presenter and audience, a possibility to make high quality records and edit them, removing from records occasional and rather rare disturbances of sound or connection, to use a whiteboard facility for discussions, the option to open desktop and to work online with texts in any format. The regular form of VIA meetings assumes that their time and Virtual room are announced in advance. Since the access to the Virtual room is strictly controlled by administration, the invited participants should enter the Room as Guests, typing their names, and their entrance and successive ability to use video and audio system is authorized by the Host of the meeting. The format of VIA lectures and discussions is shown on Fig. 2, illustrating the talk "New physics and its experimental probes" given by John Ellis from CERN in the framework of XIV Workshop. The complete record of this talk and other VIA discussions are available on VIA website [12].

The ppt or pdf file of presentation is uploaded in the system in advance and then demonstrated in the central window. Video images of presenter and participants appear in the right window, while in the upper left window the list of all the attendees is given. To protect the quality of sound and record, the participants are required to switch out their microphones during presentation and to use lower left Chat window for immediate comments and urgent questions. The Chat window can be also used by participants, having no microphone, for questions and comments during Discussion. The interactive form of VIA lectures provides oral discussion, comments and questions during the lecture. Participant should use in this case a "raise hand" option, so that presenter gets signal to switch on his microphone and let the participant to speak. In the end of presentation the central window can be used for a whiteboard utility as well as the whole structure of windows can be changed, e.g. by making full screen the window with the images of participants of discussion.

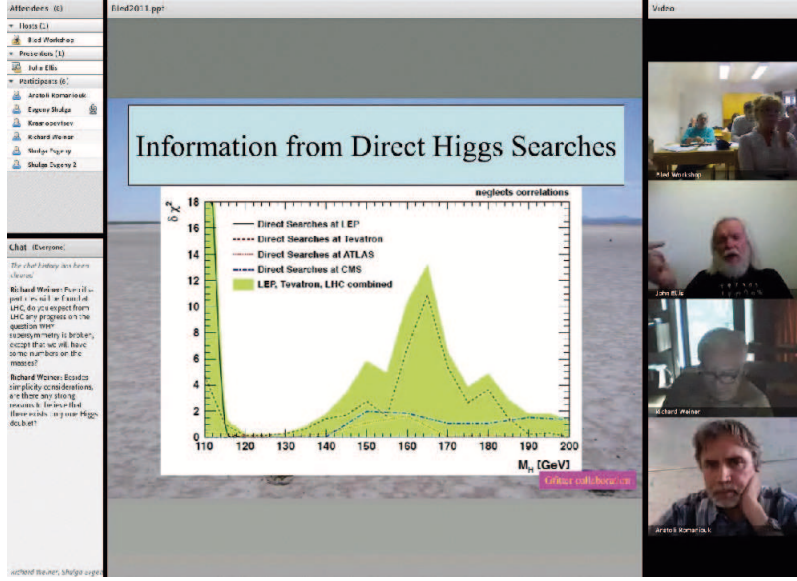


Figure 2: Videoconference Bled-Marburg-Liege-Geneva-Moscow-Paris with lecture by John Ellis, which he gave from his office in CERN, Switzerland, became a part of the program of XIV Bled Workshop.

Regular activity of VIA as a part of APC includes online transmissions of all the APC Colloquiums and of some topical APC Seminars, which may be of interest for a wide audience. Online transmissions are arranged in the manner, most convenient for presenters, prepared to give their talk in the conference room in a normal way, projecting slides from their laptop on the screen. Having uploaded in advance these slides in the VIA system, VIA operator, sitting in the conference room, changes them following presenter, directing simultaneously webcam on the presenter and the audience.

3 VIA Sessions at Bled Workshop

3.1 The program of discussions

In the course of XIV Bled Workshop meeting the list of open questions was stipulated, which was proposed for wide discussion with the use of VIA facility.

The list of these questions was put on VIA Forum (see [13]) and all the participants of VIA sessions were invited to address them during VIA discussions. Some of them were covered in the VIA lecture "New physics

and its experimental probes” given by John Ellis (see the records in [12]). During the XIV Bled Workshop the test of minimal necessary equipment was undertaken. VIA Sessions were supported by personal laptop with WiFi Internet connection only. It proved the possibility to provide effective interactive online VIA videoconferences even in the absence of any special equipment. Only laptop with microphone and webcam together with WiFi Internet connection was shown to be sufficient not only for attendance, but also for VIA presentations and discussions.

Another application at Bled Workshop was related with VIA records of closed meetings. The presentation was given in the regime of VIA on-line transmission and recorded, but the admission to the virtual room was restricted by a very short list of distant participants and the link to the record was available to a restricted list of users. Such use of VIA facility may be of interest for closed collaboration meetings.

3.2 VIA discussions

VIA sessions of XIV Bled Workshop have developed from the first experience at XI Bled Workshop [?] and their more regular practice at XII and XIII Bled Workshops [7, 8]. They became a regular part of the Bled Workshop’s programme.

In the framework of the program of XIV Bled Workshop, John Ellis, staying in his office in CERN, gave his talk ”New physics and its experimental probes” and took part in the discussion, which provided a brilliant demonstration of the interactivity of VIA in the way most natural for the non-formal atmosphere of Bled Workshops. The advantage of the VIA facility has provided distant participants to share this atmosphere and contribute the discussion. VIA sessions were finished by the discussion of puzzles of dark matter searches (see [12]). N.S. Mankoč Borštnik and G. Bregar presented possible dark matter candidates that follow from the approach, unifying spins and charges, and Maxim Khlopov presented composite dark matter scenario, mentioning that it can offer the solution for the puzzles of direct dark matter searches as well as that it can find physical basis in the above approach. H.B.Nielsen informed about his macroscopic candidate for dark matter. The comments by Rafael Lang from his office in USA were very important for clarifying the current status of experimental constraints on the possible properties of dark matter candidates (Fig. 3)

VIA sessions provided participation at distance in Bled discussions for John Ellis and A.Romaniouk (CERN, Switzerland), K.Belotsky, N.Chasnikov, A.Mayorov and E. Soldatov (MEPhI, Moscow), J.-R. Cudell (Liege, Belgium), R.Weiner (Marburg, Germany) H.Ziaepour (UK), R.Lang (USA) and many others.

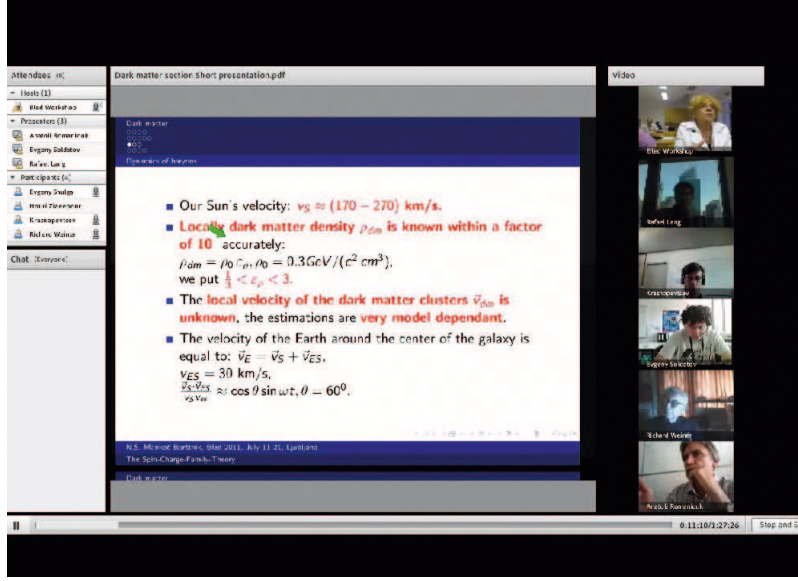


Figure 3: Bled Conference Discussion Bled-Moscow-CERN-UK-Marburg-Liege-USA

4 Conclusions

Current VIA activity is integrated in the structure of APC laboratory and includes regular weekly videoconferences with VIA lectures, online transmissions of APC Colloquiums and Seminars, a solid library of their records and presentations, together with the work of multi-lingual VIA Internet forum.

The Scientific-Educational complex of Virtual Institute of Astroparticle physics can provide regular communications between different groups and scientists, working in different scientific fields and parts of the world, get the first-hand information on the newest scientific results, as well as to support various educational programs at distance. This activity would easily allow finding mutual interest and organizing task forces for different scientific topics of astroparticle physics and related topics. It can help in the elaboration of strategy of experimental particle, nuclear, astrophysical and cosmological studies as well as in proper analysis of experimental data. It can provide young talented people from all over the world to get the highest level education, come in direct interactive contact with the world known scientists and to find their place in the fundamental research. VIA applications can go far beyond the particular tasks of astroparticle physics and give rise to an interactive system of mass media communications.

VIA sessions became a natural part of a program of Bled Workshops, opening the room of discussions of physics beyond the Standard Model for distant participants from all the world. The experience of VIA applications at Bled Workshops plays important role in the development of VIA facility as an effective tool of *e – science* and *e – learning*.

Acknowledgements

The initial step of creation of VIA was supported by ASPERA. I am grateful to P.Binetruy, J.Ellis and S.Katsanevas for permanent stimulating support, to J.C. Hamilton for support in VIA integration in the structure of APC laboratory, to K.Belotsky, A.Kirillov and K.Shibaev for assistance in educational VIA program, to A.Mayorov, A.Romaniouk and E.Soldatov for fruitful collaboration, to M.Pohl, C. Kouvaris, J.-R.Cudell, C. Giunti, G. Cella, G. Fogli and F. DePaolis for cooperation in the tests of VIA online transmissions in Switzerland, Belgium and Italy and to D.Rouable for help in technical realization and support of VIA complex. I express my gratitude to N.S. Mankoč Borštnik, G.Bregar, D. Lukman and all Organizers of Bled Workshop for cooperation in the organization of VIA Sessions at XIV Bled Workshop.

References

- [1] <http://www.aspera-eu.org/>
- [2] M.Yu. Khlopov: *Cosmoparticle physics*, World Scientific, New York -London-Hong Kong - Singapore, 1999.
- [3] M.Yu. Khlopov: *Fundamentals of Cosmoparticle physics*, CISP-Springer, Cambridge, 2011.
- [4] M. Y. Khlopov, arXiv:0801.0376 [astro-ph].
- [5] <http://www.cosmovia.org/>
- [6] M. Y. Khlopov, *Bled Workshops in Physics* **9**, 81 (2008).
- [7] M. Y. Khlopov, *Bled Workshops in Physics* **10**, 177 (2009).
- [8] M. Y. Khlopov, *Bled Workshops in Physics* **11**, 227 (2010).
- [9] <http://www.konftel.com/default.asp?id=8581>
- [10] In <http://www.cosmovia.org/> Previous - Conferences - XIII Bled Workshop

- [11] In <http://www.cosmovia.org/> Forum - Discussion in Russian - Courses on Cosmoparticle physics
- [12] In <http://www.cosmovia.org/> Previous - Conferences - XIV Bled Workshop
- [13] In <http://www.cosmovia.org/> Forum - CONFERENCES BEYOND THE STANDARD MODEL - XIV Bled Workshop "What Comes Beyond the Standard Model?"